



AENSI Journals

Journal of Applied Science and Agriculture

ISSN 1816-9112

Journal home page: [www.aensiweb.com/jasa/index.html](http://www.aensiweb.com/jasa/index.html)

## Studying the Status of Parking in Mashhad Urban Development Plans (Setting: Sajjad Boulevard)

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### ARTICLE INFO

Article history:

Received 17 November 2013

Received in revised form 20

February 2014

Accepted 24 February 2014

Available online 31 March 2014

Keywords:

Urban Parking Sustainable  
Development Urban Development  
Plans

### ABSTRACT

**Background:** In the present age, the increasing population growth and development of cities with the intervention and irrational self-seeking exploitation and destruction of the environment have led the relationship between human and urban environment to crisis. And, it has brought about adverse consequences for human. **Objective:** Today, urbanization must be based on sustainable development. That is, no action must jeopardize the environmental balance. Rather, renewable resources shall be anticipated and established in the same line with development and the promotion of environment exploitation. One of the undesirable consequences of urban population growth in recent decades includes the increasing number of automobiles and its consequent challenges. With the development of Mashhad in the recent decades regarding its position, the necessity of considering the use of urban parking in different areas of the city has been given increasing significance in urban development plans. **Results:** Development and growth of Mashhad, the inefficiencies and problems resulted from lack of adequate parking and the destruction of the sustainability factors of the city (air pollution, noise pollution, urban landscape visual pollution, destruction of nonrenewable resources, disappearance of citizens' peace and comfort) in contemporary period. **Conclusion:** status of parking use in Mashhad development plans in recent decades (from the formulation of the first urban master plan so far), which is considered to be the main reason underlying such urban problems, here: Lack of suitable status for parking in urban development plan as the special use of urban parking. Again, based on the data, tables, and maps of the existing situation, the paper examines the status of urban parking in Mashhad development plans in a crowded area of the city (Sajjad Boulevard).

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**To Cite This Article:** Mohammad Motamedi, Farhad Ghorbanian and Amir Reza Bankian Tabrizi., Studying the Status of Parking in Mashhad Urban Development Plans (Setting: Sajjad Boulevard). *J. Appl. Sci. & Agric.*, 9(3): 1083-1090, 2014

## INTRODUCTION

If city is taken to be the focus of human gatherings, perhaps we can dare say that – after human – automobile is considered to be the live element in city. Whenever we talk about city, human and automobile traffic are imagined which are always the focus of scholars' attention. A year is 8760h. If we suppose that each automobile drives 20,000km every year, it can be said that each automobile drives 55km in urban passages every day. Regarding the speed, each automobile drives only 1 and a quarter hour in its life and needs a space for the rest 22:45h when it is switched off. For each automobile, 14m<sup>2</sup> space is considered in planning. If the number of daily trips be 5.8million in Mashhad, the space required in the city for vehicle will reach 1million square meter (81km<sup>2</sup>). On the other hand, based on the last report of Mashhad Traffic Organization, total marginal parking area is about 2km<sup>2</sup> and total non-marginal area is about 0.7km<sup>2</sup>. That is total parking area existing in Mashhad is about 2.7km<sup>2</sup>. And, that is the existing space of Mashhad could respond %3 of the area required for urban parking. The number on its own can indicate the depth of the issues in big cities. The difficulty is that the space must be considered as the most constrained and expensive areas of the city.

Now, we imply some of the problems and issues resulted from automobile place (parking):

Threatening the citizens' peace via: noise pollution, air pollution, water pollution, visual pollution, and ...

Wasting time and problems resulted from this: wasting time leads to losses in work, entertainment, and ....

Wasting energy: wasting non-renewable energies

This paper examines the view of Mashhad development plans toward parking and the status of parking in them. Results show the existing situation of Mashhad and finally suitable strategies are suggested.

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*Results and Contents of the Study:**Research Questions, Objectives, and Methodology:*

This paper is aimed to identify the status of parking in Mashhad urban development plans in an accurate and efficient way. Hence, these questions must be answered:

How parking use has been considered in Mashhad master plan studies?

Where does parking use stand in Mashhad detailed plans (as the executive symbol of master plans)?

Responding the above questions is the main objective of this article. On the other hand, identifying the status and significance of parking in Mashhad master plans is the objective guided by the first question and the way to execute parking in Mashhad detailed plans is the objective guided by the second question.

*Importance and Significance of Studying Parking:*

As also described in the introduction, after human – automobile is considered to be the live element in city, and has jeopardized human life. So, ignoring the issue in urban development plans will bring about serious problems. In the following, we will discuss some implications of the entrance of automobile into present cities.

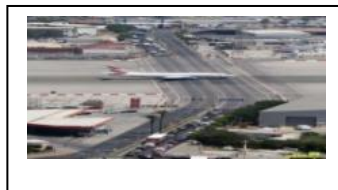
*A View on Automobile Motion in Developed and Future Countries:*

1-Photo 1: This bridge is built between Sweden and Denmark. A half is under water so that ships pass over it. Tunnel also passes through the depths of the sea. It must be noted that the similar project is executed in Dubai, as well.



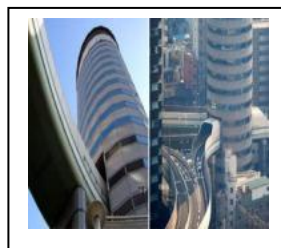
**Photo 1:** Planning for the movement of automobile and the connection between two cities

Source: [www.mehr.ir](http://www.mehr.ir)



**Photo 2:** Regarding the lack of green space, airport band path crosses the junction. Lack of space and planning for transportation spaces

Source: [www.mehr.ir](http://www.mehr.ir)



**Photo 3:** shows automobile movement on human life in developed cities, the movement of highway inside tower: Passage of automobile through tower

Source: [www.mehr.ir](http://www.mehr.ir)



**Photo 4:** shows the technology of the early and new mechanized parking in developed countries. Multi-storey parking

Source: [www.mehr.ir](http://www.mehr.ir)

*A View on Automobile Motion and Public Transportation System in Developing and Third World Countries:*



**Photo 5:** Automobile and human movement in the third world

Source: [www.mehr.ir](http://www.mehr.ir)



**Photo 6:** Public transportation in the third world

Source: [www.mehr.ir](http://www.mehr.ir)

Photo 5 and 6 show the effect of automobile movement on human life in the third world.

#### *Research Method:*

This study was conducted using data and information from reviewing library resources and respective documents. Data collection and analysis were done by means of analytical-descriptive method. In the end, conclusion and suggestions were presented for determining the special parking uses in Mashhad development plans. These documents and evidences were reviewed in the following respect:

2-3-1- Studying the growth and development of Mashhad in contemporary period and factors affecting the increase of parking demand in this city

2-3-2- The status of parking use in Mashhad development plans

2-3-3- Inefficiencies and problems resulted from lack of adequate parking space and destruction of urban sustenance factors (air pollution, noise pollution, urban landscape visual pollution, destruction of nonrenewable resources, disappearance of citizens' peace and comfort) in contemporary period

#### 2-3-4- Suggestions and strategies

##### 2-3-1- The Growth and Development of Mashhad in Contemporary Period

Due to sacred Imam Reza's shrine, Mashhad (population=2.4million) is one of the most important shrines of Shiite and annually hosts 20million pilgrims across Iran and the world today. In the last thirty years, Mashhad has transformed to a metropolis with inharmonious and imbalanced growth. Between 1976 and 2006, the population of the city increased %8; that is, from 240,000 to 2,427,000 in 2006.

Factors affecting the development and population growth of Mashhad (what are factors affecting the increasing demand of parking in Mashhad during recent years?)

Natural status of area: being located in an open wide area and lack of spatial limits.

Communication, political and religious status: being located in the communication path with Middle Asian and West countries, the historical background and religious and pilgrimage role of Imam Reza (a) shrine and establishment of security.

Immigration: extensive immigrations to Mashhad including Afghans' immigration, the financial poverty of the area, lack of water and farmland, seeking for better job and acts of God like drought.

The advance of transportation devices.

Integration of surrounding villages and cities with the consistent texture of the city: From 1965 to 1976, city expanded toward east and northeast. And, about nine villages and brick factories were combined with the city texture. Yet, from 1976 to 1986, over two cities and thirty one villages were combined with.

Land and house delivery policies after revolution and ...

2-3-2- The Status of Parking Use in Mashhad Development Plans (Where did parking use stand in Mashhad development plans?): To answer this question, we must examine the location of parking uses in the maps of Mashhad master and detailed plans.

Studying the Status of Parking in Mashhad Master Development Plans: The summary of results from the previous development plans of Mashhad and the status of parking in them are implied below:

Capacitive Master Plan of Mashhad (the first master plan of Mashhad)

The plan was notified to the Technical Office of Consulting Engineers Cooperation in August 1967. The first stage includes the identification of the general characteristics of city in May 1970 and the second stage regarding anticipations and providences in a 25-year period was approved in 1971. Among three alternatives proposed, this one was approved: the future development of city toward west and southwest around Vakilabad axis. General principles proposed by the plan are as follow:

City limit will reach from 3344hectare (1966) to about 17000hectare (1991).

General development toward west and southwest, in north to northern highway and in south to the heights will reach a slope about %15.

In this plan, Chehel Bazeh Watercourse is not located in urban texture.



**Photo 7:** Capacitive Master Plan of Mashhad

Source: FARNAHAD, Architect, and Urban Planning Consulting Engineers, (Master) Development and Construction Plan of Mashhad Metropolis – 2010

The Second Master Plan of Mashhad (Mehrazan Plan): was formulated in 1993 for a 25-year period (1991-2016) and approved by the Supreme Council of Iran Architecture and Urbanization (Photo 8). Based on plan anticipation, the population of the city will reach 3million in 2001 from 1.9million in 1991, and will be 5.4million in the horizon year of the plan (i.e. 2006). Hence, the main objective of the plan is to settle the future

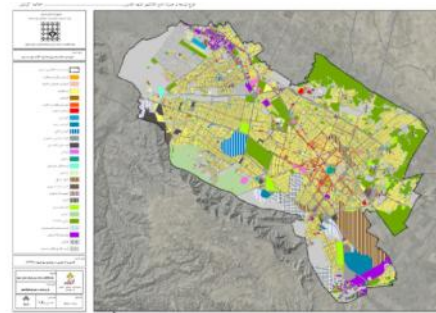


extra population of the city. Accordingly, three different arenas were taken to settle the extra 3.5million people in future including: the present area of the city, lands attached to the area, and inconsistent development.

In this plan, the average gross density of population at city level is suggested about 142 individuals in a hectare and the average pure density as 335 individuals in a hectare. Population density distribution at city level is divided into three groups based on the social and economic characteristics of target groups.



**Photo 8:** Mehrazan Master Plan Map



**Photo 9:** Farnahad Master Plan Map

Source: FARNAHAD, Architect, and Urban Planning Consulting Engineers, (Comprehensive) Development and Construction Plan of Mashhad Metropolis – 2010

The Third Master Plan of Mashhad (Farnahad Plan): The third master (construction and development) plan of sacred Mashhad metropolis is formulated with a strategic trend and in contractual terms and the same title by Khorasan-e Razavi Housing and Urbanization Organization. After conducting studies integrated with sacred Mashhad urban set plan and the advancement of the plan between 2005 and 2007 (in mid 2007), Housing and Urbanization Organization delegated the representativeness of receiving the master plan to the Construction and Development Studies and Planning Department of sacred Mashhad metropolis (Photo 9).

The plan – as the third master plan of the city – is developed by the serious participation of experts, elites, and managers from many organization and respective organs regarding the development and construction of the city. We dare say that it is the result of the participants' collective understanding.

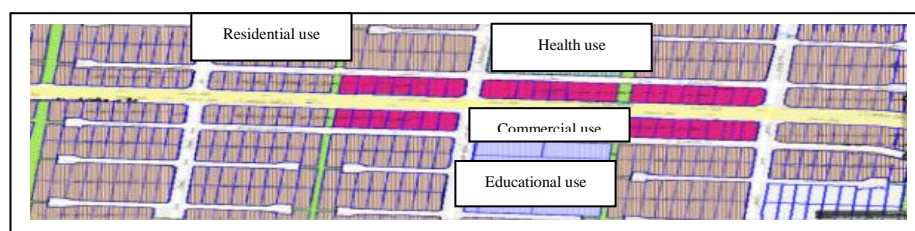
Conclusion: Studying the Status of Parking in Mashhad Master Development Plans:

After reviewing the maps of master plan, it was determined that no parking spot is seen on them. And, parking issue is implied as a critical problem in these studies.

Studying the Status of Parking in Mashhad Detailed Plans: (Setting: Sajjad Boulevard)



**Photo 10:** Map of area 1, Mashhad municipal



**Photo 11:** Map of the commercial uses of the city and other uses of detailed plan of the area under study (Sajjad Blvd.)

Source: Mashhad Municipal e-services site – [www.esup.mashhad.ir](http://www.esup.mashhad.ir)

Sajjad Blvd. area has in its margin a variety of uses including commercial uses and official centers, physicians' offices, educational institutions and many traffic activities. So, anticipating public parking in the area seems to be necessary. In Photos 10 and 11, first, the situation of the area under study is seen on map. Then, detailed plan maps and its uses are set via [www.esup.mashhad.ir](http://www.esup.mashhad.ir). In none of the maps, the anticipation of parking use is seen. Mashhad Transportation and Traffic Organization report which is given below confirms the issue (Table 1).

**Table 1:** Parking use square in the area under study (Sajjad Blvd.)

The square area of uses for lands audited (m <sup>2</sup> ), Mashhad Municipal areas, 2009												
Total infrastructure						Total infrastructure						Use
Area 12	Area 11	Area 10	Area 9	Area 8	Area 7	Area 6	Area 5	Area 4	Area 3	Area 2	Area 1	
۲۶۶۸۰	۸۲۶۰۴	۱۶۵۷۰۹	۳۶۶۱۹۰	۱۰۲۳۹۵	۱۵۳۹۱۲	۴۵۲۰۷	۶۱۷۸۱	۶۱۱۱۰	۲۴۴۹۹	۲۱۵۲۱۰	۱۵۰۵۱۳	Educational Official Residential Health Urban installations Commercial Transportation and parking Urban services Industrial Cultural, artistic, historical Green space Agricultural Religious Residential Military/disciplinary Sport
۵۱۳۶۲	۹۲۹۷۲	۴۲۶۳۴	۱۱۷۹۷۶	۳۳۴۸۶۲	۳۳۴۴۵۹	۱۳۴۰۴	۲۲۱۷۲	۱۲۰۲۲	۱۹۸۲۸	۸۵۹۰۹	۲۸۳۴۶۸	
۴۱۵	۲۷۵۲	۲۳۱۶۵	۱۴۶۶۳۸	۵۱۸۹۴۸	۵۰۹۴۶۶	۵۹۴۸	۲۱۱۱	۹۰۸	۶۲۲۷۶	۵۷۵۳۵	۱۲۰۷۸۲	
۱۳۱۱۹	۷۶۰۱	۸۶۸۲۹	۴۲۴۷۴	۱۷۳۰۵۳	۲۷۱۹۳	۳۳۱۴۷	۳۴۰۲۶	۳۶۸۶۶	۱۰۶۰۴	۵۵۳۷۵	۱۶۱۹۸۵	
۸۸۱۴	۵۷۴	۹۸۴۱	۲۰۷۰۸	-	۱۸۸۷	۲۵۸۹	۳۸۰۳	۵۹۰	۵۸۰۲	۶۲۵۷	۳۷۰۷	
۱۵۹۹۹۱	۳۳۹۶۰۳	۵۵۱۷۱۸	۳۷۲۷۴۱	۹۰۱۴۵۸	۹۴۹۴۵۸	۴۳۸۵۹۷	۴۲۳۸۸۲	۳۸۱۹۲۸	۵۹۸۵۶۰	۱۴۰۱۴۷۸	۱۰۵۸۹۴۴	
۲۵۴۶	-	۵۷۶۶	۳۹۲	۱۳۲	۵۹۵۰۷۲	۱۰۵	۱۲۷	۵۹۰۶	۶۲۹۰۵	۷۸۷۴	۴۷۵	
۹۳۳	۳۸۸۲۷	۱۳۷۷۴	۵۷۹۷	-	-	۹۰۴۹	۸۹۳۴	-	۹۶۴۰۹	-	۶۱۲۶	
۷۸۷۳۰۰	۱۵۶	۱۱۹۴۳۹۹	۳۸۱۷	۸۰۶	۸۳۳۸۰۲	۸۴۲۵۱	۱۶۲۲۶۶	۲۳۹۴۰	۳۶۲۵۷	۱۶۸۹۶۸	۶۴۸	
۳۵۰۵	۱۱۳۳۳	۹۰۰۷	۱۰۷۲۰	۳۱۶۲۷	۴۹۲۴	۴۵۹۴	۴۵۵۷	۵۳۴۷	۷۵۴۲	۳۶۹۸	۱۲۱۲۶	
۵۱۰	-	۱۵۶	۵۶۷۸	۵۳۹	۱۷۵۸	-	۱۵۶۹	۲۶۶۱	۳۱۲۰۶	۲۵۹	۷۳	
۱۴۰۱۲۸۰	۳۰۷	۱۷۴۶۶۷	۵۶۴	۲۷	۶۳۳۵۱	۱۵۲۳۱	۱۴۲۶۹	۷۴۴	۱۴۴۰۱	۴۰۴۱۱	۱۰۰	
۴۴۱۱	۱۱۵۵۰	۲۷۰۳۱	۷۳۰۸۷	۶۹۵۱۶	۵۶۵۸۰	۲۴۷۳۱	۴۴۴۷۰	۳۹۸۵۲	۱۰۴۶۳۰	۶۵۵۶۶	۳۱۸۲۲	
۱۵۱۱۳۰۰	۸۶۲۹۲۶۱	۸۰۹۸۹۵۵	۱۵۱۱۸۶۵۷	۵۹۱۶۷۷۰	۵۶۱۳۴۴۳	۲۲۸۵۰۱۱	۳۶۹۸۵۱۶	۴۰۱۹۸۲۹	۶۲۲۴۰۵۱	۱۵۹۴۶۵۳۰	۱۶۴۲۱۶۹۹	
۳۶۶۰	۶۱۵	۴۴۷۸	۴۲۴۴	۱۷۳۹۸۱	-	۳۲۸۷	۳۲۹۱	۱۲۲۶	۸۷۰۸	۷۲۵۹	۶۴۹۸	
۱۰۱۳۷	۶۰۴۷	۱۸۳۰۰	۲۰۹۲۲	۱۳۰۴۲	-	۲۹۵۴	۲۳۸۷	۲۸۰۶	۳۸۴	۶۵۴۱۱	۵۰۳۲	

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\*Organization of Statistics and Computer Services, Mashhad Municipal

Source: The Office for Municipal Transportation Studies – the sixth statistical magazine of Mashhad transportation – Mashhad – Mashhad Municipal Press – Summer 2010

As seen in the above table, in area 1, totally 275m<sup>2</sup> is anticipated for parking use. With respect to the standard space (25m<sup>2</sup> for each parking), it is determined that the space is practically suitable for 11 cars. Accordingly, in the present situation in area 1, only eleven cars are anticipated for parking. Yet, in Sajjad Blvd. (located in area 1) no parking is considered. In following tables, the volume of vehicle traffic in peak hours at Sajjad Blvd. junctions is shown by Mashhad Traffic Organization. Table 2 indicates the come-and-go of 1899 vehicles in morning peak hours (from 9:30 to 10:30) and 1923 ones in the afternoon peak hour (from 17:30 to 18:30). Table 3 indicates the come-and-go of 1813 vehicles in morning peak hours (from 11:00 to 12:00) and 1798 in afternoon peak hours (from 18:00 to 19:00). Table 4 implies the come-and-go of 1924 vehicles in morning peak hours (from 10:00 to 11:00) and 1918 in afternoon peak hours (from 18:15 to 19:15). Now, regarding the previous discussions and the statistics of the existing situation, this study is on presenting urban parking-specific use in detailed plans like other uses, the same reality ignored in development plans. And, then, it has tended to solve the crisis. Yet, it is possible to resolve many of these problems at the time of preparing urban development plans by the deeper examination of the issue.

#### Suggestions and Strategies:

With a glance on development and construction plans of Mashhad, it is observed that parking use is just considered in studies yet not in practice. Based on the increasing official and commercial use of Sajjad Blvd. in recent decades and change in its use levels (from neighborhood to area) as well as intensive need to parking, it is proposed that parking use be regarded as special use in all urban plans; as with the commercial and residential uses for which spots are anticipated on the map. For urban parking again, parking spots be anticipated on urban maps.

**Table 2:** The volume of vehicle traffic in the area under study (Sajjad Blvd.-Bozorgmehr Junction)

Site:	112 10, 04, 2013				Traffic Flow filename:MASHAD_20130410.vs									
Wednesday, 10 April 2013														
Approach 1, Detectors: 3-6														
	00:	01:	02:	03:	04:	05:	06:	07:	08:	09:	10:	11:		
:15	214	125	33	17	18	29	44	405	392	403	527	422		
:30	195	98	29	11	9	13	75	503	412	402	491	421		
:45	139	64	27	10	7	19	185	406	355	437	384	462		
:60	137	47	12	15	8	35	306	422	376	444	425	472		
Hourly														
Total	685	334	101	53	42	96	610	1736	1535	1686	1827	1777		
AM Total: 10482 AM peak 1899 09:30 - 10:30														
	12:	13:	14:	15:	16:	17:	18:	19:	20:	21:	22:	23:		
:15	425	413	369	303	353	461	498	422	392	383	390	275		
:30	410	295	360	248	321	454	456	433	438	399	397	229		
:45	481	407	329	275	381	486	452	409	357	433	385	214		
:60	462	398	297	305	370	483	457	490	406	418	341	-		
Hourly														
Total	1778	1513	1355	1131	1425	1884	1863	1754	1593	1633	1513	718		
PM Total: 18160 PM peak 1923 17:30 - 18:30														
Daily Total 28642														

**Table 3:** The volume of vehicle traffic in the area under study (Sajjad Blvd.-Bahar Junction)

Site:	111	10	04	2013	Traffic Flow filename:MASHAD_20130410.vs										
Wednesday, 10 April 2013															
Approach 1, Detectors: 2-5															
	00:	01:	02:	03:	04:	05:	06:	07:	08:	09:	10:	11:			
:15	187	130	24	11	18	17	51	352	345	303	427	466			
:30	182	90	41	16	15	25	69	399	386	369	493	445			
:45	141	59	35	7	9	23	142	420	323	359	438	442			
:60	130	44	17	14	8	29	243	359	295	392	389	460			
Hourly															
Total	640	323	117	48	50	94	505	1530	1349	1423	1747	1813			
AM Total: 9639 AM peak 1813 11:00 - 12:00															
	12:	13:	14:	15:	16:	17:	18:	19:	20:	21:	22:	23:			
:15	343	462	382	250	287	372	459	353	388	375	404	284			
:30	441	448	300	272	270	450	414	421	387	316	390	281			
:45	443	393	273	236	334	411	467	344	386	374	366	225			
:60	390	325	311	273	318	443	458	381	377	183	318	-			
Hourly															
Total	1617	1628	1266	1031	1209	1676	1798	1499	1538	1248	1478	790			
PM Total: 16778 PM peak 1798 18:00 - 19:00															
Daily Total 26417															

**Table 4:** The volume of vehicle traffic in the area under study (Sajjad Blvd.-Hameds Junction)

Site:	127 18, 04, 2013				Traffic Flow filename:MASHAD_20130418.vs									
Thursday, 18 April 2013														
Approach 1, Detectors: 2-4														
	00:	01:	02:	03:	04:	05:	06:	07:	08:	09:	10:	11:		
:15	202	109	53	15	2	11	59	286	409	485	475	426		
:30	207	139	33	21	6	5	91	318	390	424	505	462		
:45	151	94	23	10	17	18	170	326	421	425	469	446		
:60	129	67	21	11	11	55	269	354	380	474	475	455		
Hourly														
Total	689	409	130	57	36	89	589	1284	1600	1808	1924	1789		
AM Total: 10404 AM peak 1924 10:00 - 11:00														
	12:	13:	14:	15:	16:	17:	18:	19:	20:	21:	22:	23:		
:15	456	401	262	323	344	414	458	502	353	432	384	322		
:30	425	371	290	312	351	491	503	413	393	390	380	298		
:45	414	401	289	348	348	429	477	482	470	429	336	285		
:60	395	325	317	386	446	341	436	391	419	324	343	-		
Hourly														
Total	1690	1498	1158	1369	1489	1675	1874	1788	1635	1575	1443	905		

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